

**INVENTION:** Multi-scale code division frequency/wavelet multiple access

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**ABSTRACT**

The present invention describes a new communications architecture that combines orthogonal frequency division multiple access OFDMA and orthogonal Wavelet division multiple access OWDMA with multi-scale code division multiple access MS-CDMA. This invention describes the new multi-resolution complex Wavelet and the application to OWDMA which is a Wavelet generalization of OFDMA in IEEE standards 802.11a, 802.11g, 802.15.3a, 802.16. OWDMA forms multi-scale orthogonal channelization filter banks of individual or packet bursts of Wavelets.

This invention describes the new MS-CDMA and a means for the MS-CDMA to spread the users over the OFDMA/OWDMA channels over a wide frequency band and simultaneously to spread the users within each channel such that the resulting spectrum is equivalent to the current wideband CDMA spectrum and the architecture keeps the symbol rates equal to the individual channel frequency spacing. This invention supports the use of higher order symbol modulations for CDMA and the corresponding increases in data rates comparable to OFDMA since the interference between users is greatly reduced. Variable transmit power control is supported for the different MS-CDMA groups of channels.